



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Combustion engine systems

Course

Field of study

Construction and Exploitation of Means of Transport

Area of study (specialization)

Combustion Engines

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

Prof. DSc., DEng. Ireneusz Pielecha

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tel. 61-224-4502

Faculty of Civil and Transport Engineering

Piotrowo 3 street, 60-965 Poznan

Responsible for the course/lecturer:

DEng. Wojciech Cieřlik

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tel. 61-224-4502

Faculty of Civil and Transport Engineering

Piotrowo 3 street, 60-965 Poznan

Prerequisites

KNOWLEDGE: the student has basic general knowledge about the construction of the surrounding world and the laws that govern it

SKILLS: the student is able to integrate the obtained information, interpret it, draw conclusions, formulate and justify opinions

SOCIAL COMPETENCES: the student is aware of the social and economic importance of internal combustion engines



Course objective

Provision of basic information on the construction and design of internal combustion engines, taking into account the latest solutions

Course-related learning outcomes

Knowledge

Has extended knowledge of thermodynamics and fluid mechanics to the extent necessary to understand the principle of operation and calculations of thermodynamic and flow processes occurring in working machines such as heating, cooling, drying, thermal and pressure agglomeration, etc., pneumatic transport, energy conversion, etc.

He has extended knowledge of modern construction materials such as carbon plastics, composites, ceramics, in terms of their construction, processing technology and applications.

He has in-depth knowledge of the construction, principles of operation and classification of machines from a selected group.

Skills

He can write a user manual and a safety manual for a designed work machine or vehicle from a group of machines selected within the specialty

He can estimate the potential threats to the environment and people from the designed working machine and vehicle from a selected group

Is able to plan and conduct experimental studies of specific processes occurring in machines and routine tests of a working machine or a vehicle from a selected group of machines

Is able to perform a medium complex design project of a working machine or its assembly using modern CAD tools, including tools for spatial modeling of machines and calculations using the finite element method

Social competences

He is ready to critically assess his knowledge and received content

Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem on its own

Is willing to think and act in an entrepreneurial manner

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

For discussion, ongoing preparation and activity in class. Written exam. Mandatory individual reports on laboratory activities. Final credit for classes. Final credit of laboratory classes.

Programme content



Division and types of internal combustion engines. Modern engine cycles. Design of timing systems. Valve and valveless timing. Timing design, periodicals. VCR systems. Design and systems of intake and exhaust systems. Exhaust gas recirculation systems. Liquid fuel supply for spark ignition engines. Overview of the design of injection systems of SI engines. Fuel supply for diesel engines. Construction of the injection system and rules of its selection. Construction, tasks and types of ignition systems. Design of various cooling systems and construction of lubrication systems.

Teaching methods

1. Lecture with multimedia presentation
2. Exercises - solving problems
3. Laboratories

Bibliography

Basic

1. Wajand J.A., Wajand J.T., Tłokowe silniki spalinowe średnio- i szybkoobrotowe. WNT, Warszawa 2000
2. Luft S., Podstawy budowy silników. WKŁ, Warszawa 2009
3. Kowalewicz A., Wybrane zagadnienia samochodowych silników spalinowych. Wydawnictwo WSI, Radom 1996.
4. Kneba Z., Makowski S., Zasilanie i sterowanie silników. WKŁ, Warszawa 2004
5. Gajek A., Juda Z., Czujniki, WKŁ, Warszawa 2008

Additional

1. Materiały konferencyjne dotyczące silników spalinowych
2. Kwartalnik Combustion Engines, www.combustion-engines.eu
3. Zimmermann W., Schmidgall R., Magistrale danych w pojazdach: protokoły i standardy. WKŁ, Warszawa 2008.

Breakdown of average student's workload

	Hours	ECTS
Total workload	110	4,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	50	2,0

¹ delete or add other activities as appropriate